IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Serial No: 10/563,198   Art Unit: 1796
Filed: January 23, 2006   Examiner: Ahvazi, Bijan
Title: DISPERSE DYE MIXTURES WHICH
HAVE A HIGH DEGREE OF LIGHT FASTNESS

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Hon. Commissioner of Patents & Trademarks
Washington, D. C. 20 231

DECLARATION (Rule 132)

Sir:

I, Adrian Murgatroyd from Rossendale, UK, declare: I am a Chemical Engineer and a citizen of the United Kingdom, residing at Wed 9, 65929 Frankfurt am Main, Federal Republic of Germany.

Since completing my studies at the University of Exeter in the United Kingdom, I have been employed as a textile technician by Tootal Limited, Manchester, UK and as a development manager by ICI (subsequently Zeneca), Manchester, UK. The textile activities of Zeneca were taken over by BASF Aktiengesellschaft, Ludwigshafen, Germany, where I worked as a product manager and as a development manager. In October 2000 BASF transferred its activities in the textile dyestuff field to DyStar and since then I have been employed by DyStar Textilfarben GmbH & Co. Deutschland KG in Frankfurt, Germany as a product development manager for disperse dyes.

I have had adequate professional experience in the field to which patent application Serial No. 10/563,198, filed January 23, 2006, pertains and which was filed by Toshio Hihara, Wataru Seto, Koichi Fujisaki, Daisuke Hosada and Hiroshi Inoue.
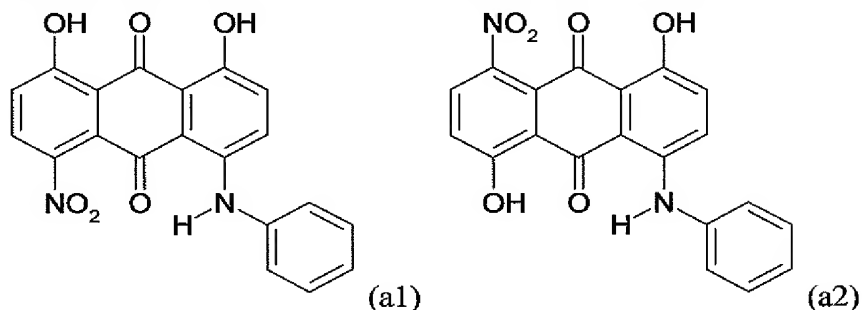

I further declare:

In order to demonstrate that the dyestuff mixtures according to the present application are not obvious over the teachings of the prior art the tests described below have been carried out
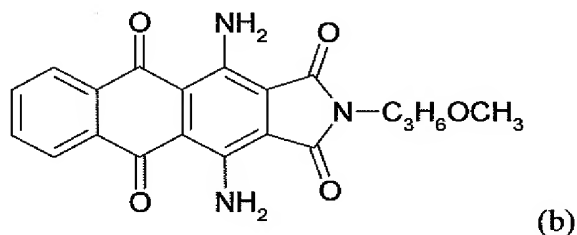
under my personal guidance and supervision.

I. DYESTUFFS AND DYESTUFF MIXTUURES

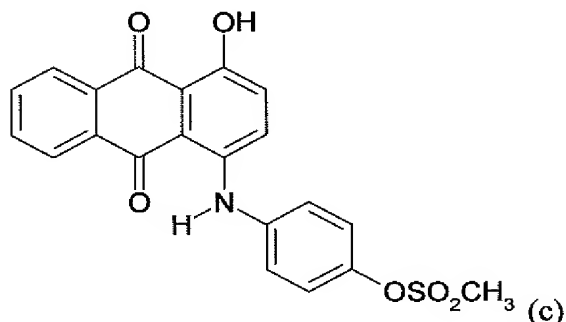1. Dyestuff a which is an isomer mixture of the formulae a1 and a2

(a1)   (a2)

corresponding to the dyestuff of the formula (3) of US 5,734,028 to Himeno et al. (prior art)

2. Dyestuff of the formula b

(b)

corresponding to the dyestuff of the formula (8) of JP 04-164969 to Izutsu et al. and to the dyestuff of the formula (9) of US 5,332,404 to Himeno et al. (prior art)

3. Dyestuff of the formula c

(c)

corresponding to the dyestuff of the formula (10) of US 5,332,404 to Himeno et al. (prior art)

4. Dyestuff Mixture A comprising
- 75% by weight of the dyestuff of formula (b) and
- 25% by weight of the Dyestuff of formula (c)

corresponding to the dyestuff mixture of Example 75 of US 5,332,404 to Himeno et al. (prior art)

5. Dyestuff Mixture B comprising
- 60% by weight of Dyestuff a,
- 10% by weight of Dyestuff b and
- 30% by weight of Dyestuff c

according to the present invention.

6. Dyestuff Mixture C comprising
- 60% by weight of Dyestuff a,
- 30% by weight of Dyestuff b and
- 10% by weight of Dyestuff c

according to the present invention.

7. Dyestuff Mixture D comprising
- 30% by weight of Dyestuff a,
- 60% by weight of Dyestuff b and
- 10% by weight of Dyestuff c

according to the present invention.

8. Dyestuff Mixture E comprising
- 10% by weight of Dyestuff a,
- 60% by weight of Dyestuff b and
- 30% by weight of Dyestuff c

according to the present invention.

II. PRODUCING OF THE DYEINGS

Dyeings of each of Dyestuff a, b and c and Dyestuff Mixtures A to E were produced using a conventional exhaustion process as follows:

Substrate: 5,0 g of Polyester double pique (Toray)

Liquor ratio: 1:10

pH : 4,5 (acetic acid /sodium acetate)

Dispersing agent: 1g/liter of Sera® Gal P-LP (supplier DyStar Textilfarben GmbH)

Temp. x Time: 130°C x 60 min. (90 -- 130°C: 2,0°C/min.)

Aftertreatment: Reduction clear

III. DETERMINATION OF THE BUILD UP PROPERTIES

The color depths of the dyeings obtained according to II above were determined by measuring their remission in the visible range of from 400 to 700 nm and determining their overall remission, INTEG value, which is based on K/S value (Kubelka-Munk function) and described below.

$$\text{INTEG value} = \sum_{\lambda=400}^{\lambda=700} I_\lambda \cdot K/S_\lambda \cdot (x_\lambda + y_\lambda + z_\lambda)$$

I_λ : the spectral energy distribution of Illuminant

x_λ , y_λ , z_λ : the color-matching functions

IV. RESULTS

As can be seen from the attached chart Dyestuff b has very poor build up properties whereas Dyestuff c performs very well. Prior art Dyestuff Mixture A which is a mixture of Dyestuffs b and c performs slightly better than would be expected by a skilled person.

Dyestuff a shows a curve which is very steep in the beginning but the final Integ value which can be reached is limited.
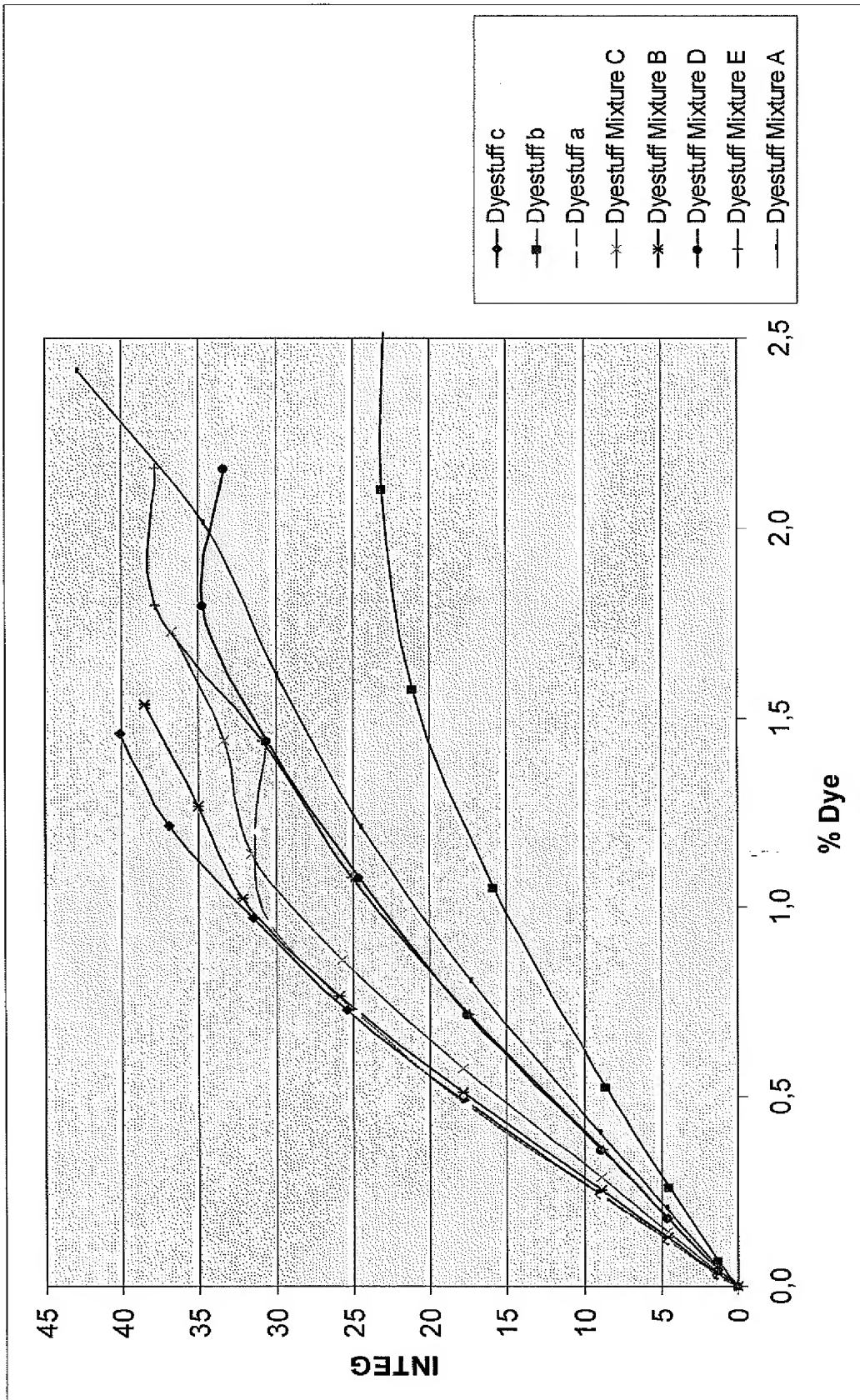
In contrast to these known dyestuffs and dyestuff mixture, respectively, the inventive Dyestuff Mixtures B, C, D and E perform better and especially better as expected.

The build-up of Dyestuff Mixtures B and C reach a higher final Integ value than Dyestuffs a and b, even though the mixtures are comprised of 60% of Dyestuff a and 10% (respectively 30%) of Dyestuff b.

The build-up of Dyestuff Mixtures D and E also reach a higher final Integ value than Dyestuffs a and b, even though the mixtures are comprised of 60% of the very poor Dyestuff b and 10% (respectively 30%) of Dyestuff a.

These improvements could not be foreseen for a person skilled in the art and were thus unexpected and surprising.

Build-up Chart.

Legend:
- Dyestuff c
- Dyestuff b
- Dyestuff a
- Dyestuff Mixture C
- Dyestuff Mixture B
- Dyestuff Mixture D
- Dyestuff Mixture E
- Dyestuff Mixture A

Y-axis: INTEG (0, 5, 10, 15, 20, 25, 30, 35, 40, 45)

X-axis: % Dye (0,0 0,5 1,0 1,5 2,0 2,5)

I further declare that I understand the contents of this Declaration, that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at Frankfurt

This *29* day of *May*, *2009*

..............*A. J. Murgatroyd.*..........

(Adrian Murgatroyd)